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**Diseaseresistance and Yield Promoter for Rubber Trees and Thereof
Preparation**

[橡胶树抗病增胶剂及其制备方法]

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Claims

1. A kind of diseaseresistance and yield promoter for rubber trees, characterized by that it is composed of (weight percent) 2.5~12.5% of 2-chlorothylphonic acid, 0.05~0.1% of ammonium molybdate or molybdic acid, 0.05%~0.5% of boric acid, 0.5~1% of glycerine, 0.5~1% of orthophosphorous acid or phosphoric acid or 0.8% of metalaxyl, 5~9% of polyvinyl alcohol and water for the rest.
2. A preparation of the diseaseresistance and yield promoter for rubber trees described in Claim 1, characterized by:
 - 1) The polyvinyl alcohol mixed with water is heated and stirred until completely dissolved to prepare the jelly containing 7.5~9% of polyvinyl alcohol. It is cooled down for later application.
 - 2) The watery solution of ammonium molybdate or molybdic acid is prepared in the proportion that ammonium molybdate or molybdic acid: water = 1:5~15. The boric acid watery solution is prepared in the proportion that boric acid: water = 1:5~15. And the water solution of orthophosphorous acid or phosphoric acid is prepared in the proportion that orthophosphorous acid or phosphoric acid: water = 1:5~15;
 - 3) In weight percents, 0.5~3% of ammonium molybdate or molybdic acid solution, 0.5~5% of boric acid solution, 5~10% of orthophosphorous acid or phosphoric acid solution or 0.5~1% of metalaxyl and 0.5~3% of glycerine are added into the 75~90% of polyvinyl alcohol jelly

in turn. It is stirred completely under the ambient temperature.

At last, 2.5~12.5% of 2-chloroethylphonic acid is added. The termination product is prepared after 15 minutes of stirring.

Description

Diseaseresistance and Yield Promoter for Rubber Trees and Thereof

Preparation

This invention is involved in a kind of controlled release agrochemicals, diseaseresistance and yield promoter for rubber trees, and thereof preparation.

At present, 2-chloroethylphonic acid (Ethrel) is extensively applied to promote the yield of gum at home and abroad. In order to lessen the side effects, it is applied in the form of compounds, e.g. watery solution, oily solution, emulsion or paste. The research is orientated toward its penetrating ability, rainwater resistance and compatibility so as to reduce its side effects. The gum yield promoter and vegetation regulator published by the Chinese Patents ZL901103006.X and ZL90107763.1 as well as the ethrel compounds (ethrel+molybdenum+starch) applied on the rubber trees in Yunnan are exclusively in form of paste. The deficiencies of the current technology are as follows. Firstly, since the carriers are made from natural starches, such as mandioc, musa, batata and the derivatives of natural cellulose (CMC or MC), they tend to be hydrolyzed into glucose by the reaction with acid (ethrel) or enzyme.

In that way, it may mold, deteriorate and lose stickability. Though sodium benzoate is added as preservative sometimes, it cannot extend their shelf-life satisfactorily. Moreover, the paste on the

gum cut tends to mold. In some compositions, there are copper ions in CRT, which will contaminate the gum when applied on the gum cut.

When copper ion content is more than 8 ppm, the gum will slime and deteriorate. In the self-prepared paste, when CRM in it is contacted with ethrel, a flocculating settling may be formed, which will influence the effects of the agrochemicals. Since the paste's shelf life is not long, it has to be prepared before application, which makes it impossible for batch production. The mistake in metering during the preparation will cause undue side effects. Secondly, since cut canker is a kind of common disease rubber trees, both the promoter (every 12 days) and disinfectant shall be applied alternatively, which increase the workload of operators. Thirdly, since the action period of the paste is comparative short, it is necessary to apply frequently, approximate 14 times every year.

The labor cost is expensive.

The purpose of this invention is to overcome the above mentioned defects of the current technologies and provide a kind of diseaseresistance and yield promoter for rubber trees with good stability, long shelflife, long action period, safeness and multifunction, and thereof preparation.

The purpose of this invention is accomplished in the way as follows:

The diseaseresistance and yield promoter for rubber trees is composed of (weight percent) 2.5~12.5% of 2-chloroethylphonic acid, 0.05~0.1% of ammonium molybdate or molybdic acid, 0.05%~0.5% of boric

acid, 0.5~1% of glycerine, 0.5~1% of orthophosphorous acid or phosphoric acid or 0.8% of metalaxyl, 5~9% of polyvinyl alcohol and water for the rest.

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Among the above-mentioned solutions, when the main chemicals, 2-chloroethylphonic acid, is absorbed by the bark, it will release ethene and phosphoric acid. The former promotes the gum yield and the latter acts as disinfectant. The microelement, molybdenum, promotes the growth of rubber trees and improves the gum quality.

Boron increases the growth of stem girth, gum yield and gum concentration of rubber trees. Phosphor participates in the majority of physiological and biochemical processes. The bark with the stronger vitality contains more phosphor, which can not only promote the growth of younglings, but also enhance the resistance of rubber trees to coldness and drought. Phosphoric acid and metalaxy have strong disinfecting abilities. Glycerine improves the penetrating ability of ethrel and increases the absorption capacity of the barks.

The controlled release carrier, vinyl alcohol is well compatible with -OH of ethrel. Boric acid not only acts as a provider of microelement, boron, but also thickens the polyvinyl alcohol solution, which, in turn, improves its stability.

The preparation of the disease resistance and yield promoter for rubber trees involved in this invention is as follows:

- 1) The polyvinyl alcohol mixed with water is heated by steam and stirred until completely dissolved to prepare the jelly containing 7.5~9% of polyvinyl alcohol. It is cooled for later application.
- 2) The watery solution of ammonium molybdate or molybdic acid is prepared in the proportion that ammonium molybdate or molybdic acid: water = 1:5~15. The boric acid watery solution is prepared in the proportion that boric acid: water = 1:5~15. And the water solution of orthophosphorous acid or phosphoric acid is prepared in the proportion that orthophosphorous acid or phosphoric acid: water = 1:5~15;
- 3) In weight percents, 0.5~3% of ammonium molybdate or molybdic acid solution, 0.5~5% of boric acid solution, 5~10% of orthophosphorous acid or phosphoric acid solution or 0.5~1% of metalaxyl and 0.5~3% of glycerine are added into 75~90% of polyvinyl alcohol jelly in turn. It is stirred completely under the ambient temperature.
At last, 2.5~12.5% of 2-chloroethylphonic acid is added. The termination product is prepared after 15 minutes of stirring.

Compared with the current technology, the compound involved in this invention has the following obvious advantages:

1. The solution is provided with good stability. Under the ambient temperature, the product involved in this invention can be stored for 22 months without any deterioration and precipitation. Therefore, it can be produced in batches.

2. Since the product involved in this invention is a kind of controlled release chemicals, it is absorbed by the barks, which avoids the side effect of high concentration ethene to the barks. Therefore, the effects can last for long, which reduces the application frequency from every 12~15 days to more than every 30 days.
3. The disease resistance of current agrochemicals is not sufficient for the serious situation. The product involved in this invention contains more disinfection components, especially against rubber tree canker. It integrates stimulation, nutrition and disease-resistance functions into one, so as to reduce the labor expenses and agrochemicals cost.

Example 1: (weight percent is applicable below)

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1000 kg of compounds containing 5% of 2-chloroethylphonic acid, 0.1% of ammonium molybdate, 0.5% of boric acid, 1% of phosphoric acid, 1% of glycerine, 5.4% of polyvinyl alcohol is prepared in the way as follows:

- 1) 5.4 kg of polyvinyl alcohol mixed with 72.6 kg of water is heated by steam and stirred until completely dissolved to prepare 78 kg polyvinyl alcohol jelly, which is cooled down for later application.
- 2) 0.1 kg of ammonium molybdate is dissolved in 0.9 kg of water, 0.5 kg of boric acid is dissolved in 4.5 kg of water and 1 kg of phosphoric acid is dissolved in 9 kg of water, respectively.

- 3) The above prepared 78 kg of polyvinyl alcohol jelly is put in a blending barrel with a running stirrer. Then, 1 kg of ammonium molybdate solution, 5 kg of boric acid solution, 10 kg of phosphoric acid solution and 1 kg of glycerine are added in turn. It is stirred completely. Then, 5 kg of 2-chloroethylphonic acid is added. After stirred for another 10~15 minutes, the termination product is prepared.

Example 2:

1000 kg of compounds containing 7.5% of 2-chloroethylphonic acid, 0.05% of molybdic acid, 0.4% of boric acid, 0.8 % of metalaxyl, 0.7% of glycerine and 7% of polyvinyl alcohol is prepared in the way as follows:

- 1) 7 kg of polyvinyl alcohol mixed with 79.5 kg of water is heated by steam and stirred until completely dissolved to prepare 86.5 kg of polyvinyl alcohol jelly, which is cooled for later application.
- 2) 0.05 kg of molybdic acid is dissolved in 0.45 kg of water and 0.4 kg of boric acid is dissolved in 3.6 kg of water, respectively.
- 3) The above prepared 86.5 kg of polyvinyl alcohol jelly is put in a blending barrel with a running stirrer. Then, 0.5 kg of molybdic acid solution, 4 kg of boric acid solution, 0.8 kg of metalaxyl and 0.7 kg of glycerine are added in turn. It is stirred completely. Then, 7.5 kg of 2-chloroethylphonic acid is added. After stirred

for another 10~15 minutes, the termination product is prepared.

In the current technology, the paste is applied before the rubber tree bark is cut. When the rubber tree shall be cut for gum 2~3 days after the agrochemicals is applied, the active ingredients in the agrochemicals have not been completely absorbed. In order to make full use of the long residual action of the product involved in this invention, it should be applied 1 cm around the cut (The bark to be applied with the product shall be whittled down) so as to maintain the effects.